General

Guideline Title

Prevention of vascular and metabolic disease. In: Guidelines for preventive activities in general practice, 8th edition.

Bibliographic Source(s)

Prevention of vascular and metabolic disease. In: Guidelines for preventive activities in general practice, 8th edition. East Melbourne (Australia): Royal Australian College of General Practitioners; 2012. p. 50-9.

Guideline Status

This is the current release of the guideline.

Recommendations

Major Recommendations

The levels of evidence (I-IV, Practice Point) and grades of recommendations (A-D) are defined at the end of the "Major Recommendations" field.

Assessment of Absolute Cardiovascular Risk

Absolute cardiovascular risk assessment should be conducted at least every 2 years in all adults aged 45 years and older who are not known to have cardiovascular diseases (CVDs) or to be at clinically determined high risk (National Vascular Disease Prevention Alliance, 2012) (B). This calculation requires information on the patient's age, sex, smoking status, total and high density lipoprotein (HDL) cholesterol, systolic blood pressure (SBP) and if the patient is known to have diabetes or left ventricular hypertrophy (LVH).

Cardiovascular Disease: Identifying Risk

Population Group	What Should Be Done?	How Often?	Reference
Adults aged 45 years and older not known to have cardiovascular disease (CVD) or not clinically determined to be at high risk.	Calculate absolute cardiovascular risk* 45–74 years. (II,B) ≥75 years. (Practice Point)	Every 2 years† (IV,C)	National Vascular Disease Prevention Alliance, 2012
Aboriginal and Torres Strait Islander peoples aged 35 years and older not known to have CVD or not clinically determined to be at	Assess absolute CVD risk (may underestimate risk).	Every 2 years	

high risk Population Group	(IV,C) What Should Be Done?	(IV,C) How Often?	Reference

*Calculate risk using the *National Vascular Prevention Disease Alliance charts* (see Appendix 5 in the original guideline document) or online at www.cvdcheck.org.au. Blood lipid results within 5 years can be used in the calculation of absolute CVD risk, but blood pressure (BP) should be measured at the time of assessment. On-therapy measures of BP and cholesterol may underestimate absolute risk and thus recently recorded pre-treatment measures may be more appropriate to use if available. An electrocardiograph (ECG) is not required to determine LVH if not previously known.

†Adults with any of the following do not require absolute CVD risk assessment using the Framingham Risk Equation because they are already known to be at clinically determined high risk of CVD (IV,D):

Diabetes and age >60 years
Diabetes with microalbuminuria (>20 µg/min or urine albumin:creatinine ratio [UACR] >2.5 mg/mmol for males, >3.5 mg/mmol for females)
Moderate or severe chronic kidney disease (CKD) (persistent proteinuria or estimated glomerular filtration rate [eGFR] <45 mL/min/1.73 m^2)
Previous diagnosis of familial hypercholesterolaemia (FH)
SBP ≥180 mmHg or diastolic blood pressure (DBP) ≥110 mmHg
Serum total cholesterol >7.5 mmol/L
Aboriginal or Torres Strait Islander peoples aged over 74 years (Practice Point)

Adults aged older than 74 years may have their absolute risk assessed with age entered as 74 years. This is likely to underestimate 5-year risk but will give an estimate of minimum risk (National Vascular Disease Prevention Alliance, 2009). Patients with a strong family history of CVD (first-degree relatives) or obesity (body mass index [BMI] above 30 kg/m^2 or more) may be at greater risk (Welborn, Dhaliwal, & Bennett, 2003; van Dis et al., 2009; Levy et al., 2006). Similarly patients with depression and atrial fibrillation (AF) may be at increased risk (National Vascular Disease Prevention Alliance, 2012).

See Appendix 5 in the original guideline document or www.cvdcheck.org.au.

BP

BP should be measured in all adults from age 18 years (A) at least every 2 years. BP should be interpreted in the context of an absolute cardiovascular risk assessment after age 45 years (35 years of age for Aboriginal and Torres Strait Islander peoples) (B). Secondary causes of hypertension and 'white coat' hypertension should be considered.

Hypertension: Identifying Risk

Who Is at Risk?	What Should Be Done?	How Often?	References
Low Absolute Risk • <10% cardiovascular disease (CVD) risk	Provide lifestyle advice and education. (I,B) Offer pharmacotherapy if blood pressure (BP) persistently over 160/100 mmHg.	BP every 2 years (III,C)	National Vascular Disease Prevention Alliance, 2012; U.S. Preventive Services Task Force (USPSTF), 2007; National Heart Foundation of Australia, 2010; Vasan et al., 2001
Moderate Risk • 10%–15% absolute cardiovascular risk	Provide intensive lifestyle advice. (II,B) Consider pharmacotherapy if risk factors have not reduced after 3–6 months of lifestyle intervention. Offer pharmacotherapy simultaneously with lifestyle intervention if BP persistently over 160/100 mmHg or if family history of premature CVD or South Asian, Middle Eastern, Maori, Aboriginal or Pacific Islander descent. (III,C)	BP every 6–12 months (III,C)	Welborn, Dhaliwal, & Bennett, 2003; National Vascular Disease Prevention Alliance, 2012; van Dis et al., 2009; Levy et al., 2006; USPSTF, 2007; Australian Institute of Health and Welfare, 2001

Who Is at Risk?	What Should Be Done?	How Often?	References

High Risk
• >15% absolute cardiovascular risk
• Clinically determined high risk:
  • Diabetes and age >60 years
  • Diabetes with microalbuminuria (>20 µg/min or urine albumin-to-creatinine ratio [UACR] >2.5 mg/mmol for males, >3.5 mg/mmol for females)
  • Moderate or severe chronic kidney disease (CKD) (persistent proteinuria or estimated glomerular filtration rate (eGFR) <45 mL/min/1.73 m^2)
  • Previous diagnosis of familial hypercholesterolaemia (FH)
  • Systolic blood pressure (SBP) ≥180 mmHg or diastolic blood pressure (DBP) ≥110 mmHg
  • Serum total cholesterol >7.5 mmol/L
  • Aboriginal and Torres Strait Islander peoples aged over 74 years
	Provide intensive lifestyle advice (II,B)
	
	Commence pharmacotherapy (simultaneously with lipid therapy unless contraindicated).
	
	Treatment goal is BP <140/90 mmHg in adults without CVD including those with CKD (I,B–III,D)* (≤130/80 in people with diabetes or micro or macroalbuminuria [UACR >2.5 mg/mmol in males and >3.5 mg/mmol in females]).
		BP every 6–12 weeks (III,C)	National Vascular Disease Prevention Alliance, 2012; National Heart Foundation of Australia, 2010
			
			Go et al., 2004; Culleton et al., 1999

High Risk Existing CVD (previous event, symptomatic CVD), stroke or transient ischaemic attacks (TIA) or CKD	Lifestyle risk factor counseling Pharmacotherapy to lower risk (I,A)	Every 6 months (III,C)	National Heart Foundation of Australia, 2010

*D recommendation for clinically determined high risk.

Hypertension: Preventive Interventions

Intervention	Technique	References

Intervention	Technique	References
Measure blood pressure (BP)	Measure BP on at least 2 separate occasions with a calibrated mercury sphygmomanometer, or automated device that is regularly calibrated against a mercury sphygmomanometer. At the patient's first BP assessment, measure BP on both arms. Thereafter, use the arm with the higher reading. In patients who may have orthostatic hypotension (e.g., the elderly, those with diabetes), measure BP in sitting position and repeat after the patient has been standing for at least 2 minutes. If possible, use ambulatory BP monitoring or self-measurement for patients with any of the following: • Unusual variation between BP readings in the clinic • Suspected 'white coat' hypertension • Hypertension that is resistant to drug treatment • Suspected hypotensive episodes (e.g., in elderly or diabetic patients) Risk calculation should be performed using clinical BP measurements (as the algorithms are based on these). Ambulatory BP readings are considered to be better predictors of outcomes than clinic BP measurements, and therefore should be used to monitor BP lowering therapy.	National Vascular Disease Prevention Alliance, 2012; National Heart Foundation of Australia, 2010
Lifestyle modification	Lifestyle risk factors should be managed at all risk levels. All people, regardless of their absolute risk level, should be given dietary advice. Those at low to moderate absolute risk of cardiovascular disease (CVD) should be given dietary and other lifestyle advice (See the NGC summary of the Royal Australian College of General Practitioners [RACGP] guideline Prevention of chronic disease.) Advise to aim for healthy targets: • At least 30 minutes of moderate-intensity physical activity on most, if not all, days • Smoking cessation • Waist measurement <94 cm for men and <80 cm for women, body mass index (BMI) <25 kg/m^2 • Dietary salt restriction ≤4 g/day (65 mmol/day sodium) • Limit alcohol intake to ≤2 standard drinks per day for males and ≤1 standard drink per day for females	National Vascular Disease Prevention Alliance, 2012; National Heart Foundation of Australia, 2010
Medications	BP treatment should aim to lower BP towards (while balancing risks and benefits): • ≤140/90 for adults without CVD (including those with chronic kidney disease [CKD]) • ≤130/80 for adults with diabetes or with micro- or macro-albuminuria (urine albumin-to-creatinine ratio [UACR] >2.5 mg/mmol for males, >3.5 mg/mmol for females) Treatment may commence with an angiotensin converting enzyme (ACE) inhibitor, angiotensin II antagonist, calcium channel blocker or a low-dose thiazide or thiazide-like diuretic. A second or third agent from a different class may be added to treat towards targets.	National Vascular Disease Prevention Alliance, 2012

Cholesterol and Other Lipids

Adults should have their fasting blood lipids assessed starting at age 45 years, every 5 years (A for males, C for females). Lipid levels should be interpreted in the context of an absolute cardiovascular risk assessment after age 45 years (35 years for Aboriginal and Torres Strait Islander peoples) (B). Aboriginal and Torres Strait Islander adults should have fasting lipid tests performed every 5 years from age 35 years (B).

Cholesterol and Lipids: Identifying Risk

Who Is at Risk?	What Should Be Done?	How Often?	References
Low Risk	Provide lifestyle advice. (I,A)	Repeat fasting	National Vascular Disease Prevention Alliance, 2012

Who Is at Risk?	What Should Be Done?	How Often?	References
• Absolute cardiovascular disease (CVD) risk <10%		lipids every 5 years*	
Moderate Risk • Absolute CVD risk 10%–15%	Provide intensive lifestyle advice. (II,B) Consider pharmacotherapy if not reaching target after 6 months (I,A) or if family history of premature CVD, or Aboriginal or Torres Strait Islander, South Asian, Middle Eastern, Maori or Pacific Islander descent. (II,C)	Repeat fasting lipids every 2 years	Welborn, Dhaliwal, & Bennett, 2003; National Vascular Disease Prevention Alliance, 2012; van Dis et al., 2009; Levy et al., 2006

High Risk
• Absolute cardiovascular risk >15%
• Patient with the following clinically determined high-risk factors:
  • Diabetes and age >60 years
  • Diabetes with microalbuminuria (>20 µg/min or urine albumin-to-creatinine ratio [UACR] >2.5 mg/mmol for males, >3.5 mg/mmol for females)
  • Chronic kidney disease (CKD) persistent microalbuminuria or Stage 4 renal failure (estimated glomerular filtration rate [eGFR] <30 mL/min/1.73 m^2) or Stage 3a renal failure (eGFR <45 mL/min/1.73 m^2)
  • Previous diagnosis of familial hypercholesterolaemia (FH)
  • Systolic blood pressure (SBP) >180 mmHg or diastolic blood pressure (DBP) >110 mmHg
  • Serum total cholesterol >7.5 mmol/L
  • Aboriginal and Torres Strait Islander peoples aged over 74 years
 	
See the "BP" section above.
	Provide intensive lifestyle advice. (II,C)
	
	Commence cholesterol lowering therapy (simultaneously with antihypertensive unless contraindicated).† (II,C-III,D)
		Every 12 months (III,C)	National Vascular Disease Prevention Alliance, 2012

High Risk Existing CVD (previous event, symptomatic CVD).	Lifestyle risk factor counselling Pharmacotherapy to lower risk (I,A)	Every 12 months (III,C)	National Stroke Foundation (NSF), 2010

*Lipid blood test results within 5 years can be used to calculate absolute CVD risk every 2 years. Patients with diabetes, cardiac disease, stroke, hypertension or kidney disease should have their lipids tested every 12 months (III,C).

†D recommendation for clinically determined high risk.

Cholesterol and Lipids: Preventive Interventions

Intervention	Technique	References
Fasting blood lipids	Fasting total cholesterol, low-density lipoprotein (LDL) cholesterol, high-density lipoprotein (HDL) cholesterol and triglycerides (TG). If lipid levels are abnormal, a second confirmatory sample should be taken on a separate occasion (as levels may vary between tests) before a definitive diagnosis is made.	Tonkin et al., 2005
	Screening tests using capillary blood samples produce total cholesterol results that are slightly lower than on venous blood. These may be used, providing they are confirmed with full laboratory testing of venous blood for patients with elevated levels and there is good follow-up.	Bachorik et al., 1991; Bradford et al., 1990
	In adults at low absolute risk of cardiovascular disease (CVD), blood test results within 5 years may be used for review of absolute cardiovascular risk unless there are reasons to the contrary.	
Lifestyle modification	Lifestyle risk factors should be managed at all risk levels. All people, regardless of their absolute risk level, should be given dietary advice Those at low to moderate absolute risk of CVD should be given dietary and other lifestyle advice (see the NGC summary of the RACGP guideline Prevention of chronic disease). Advise to aim for healthy targets: • At least 30 minutes of moderate-intensity physical activity on most, if not all, days • Smoking cessation • Waist measurement <94 cm for men and <80 cm for women, body mass index (BMI) <25 kg/m^2 • Dietary salt restriction ≤4 g/day (65 mmol/day sodium) • Limit alcohol intake to ≤2 standard drinks per day for men and ≤1 standard drink per day for women	National Vascular Disease Prevention Alliance, 2012; National Heart Foundation of Australia, 2010
Pharmacotherapy	Lipid lowering therapy for primary prevention should (while balancing risks and benefits) aim towards: • Total cholesterol <4.0 mmol/L • HDL-C ≥1.0 mmol/L • LDL-C <2.0 mmol/L • Non-HDL-C <2.5 mmol/L • TG <2.0 mmol/L Treatment should commence with a statin. If LDL-C levels are not sufficiently reduced on maximally tolerated dose of a statin, add one of ezetimibe, bile acid binding resin or nicotinic acid. These agents may be used as monotherapy if statins cannot be tolerated at all. If TG levels remain elevated, consider use of one of fenofibrate, nicotinic acid or fish oil.	National Vascular Disease Prevention Alliance, 2012

Type 2 Diabetes

Patients should be screened for diabetes every 3 years from age 40 years using the Australian Type 2 Diabetes Risk Assessment Tool (AUSDRISK) (B). Aboriginal and Torres Strait Islander peoples should be screened from age 18 years. Those with a risk score of 12 or more should be tested by fasting plasma glucose (C).

Type 2 Diabetes: Identifying Risk

Who Is at Risk?	What Should Be Done?	How Often?	References
Increased Risk • Age >40 years • Aboriginal and Torres Strait Islander peoples	Australian Type 2 Diabetes Risk Assessment Tool (AUSDRISK) (III,B) (See Appendix 4 in the original guideline document).	Every 3 years (III,C)	National Health and Medical Research Council (NHMRC), 2009

High Risk
• Any 1 of following risk factors:
  • AUSDRISK score of 12 or more
  • All people with a history of a previous cardiovascular event (acute myocardial infarction or stroke)
  • Women with a history of gestational diabetes mellitus
  • Women with polycystic ovary syndrome
  • Patients on antipsychotic drugs
	Fasting blood sugar (III,B)	Every 3 years (III,C)	NHMRC, 2005; Iseki et al., 2003

High Risk • Those with impaired glucose tolerance test or impaired fasting glucose (not limited by age)	Fasting blood sugar (III,B)	Every 12 months (III,C)	NHMRC, 2005

Tests to Detect Diabetes

Test	Technique	References
Fasting blood sugar	Measure plasma glucose levels on a fasting sample. • <5.5 mmol/L: diabetes unlikely • 5.5–6.9 mmol/L fasting: may need to perform an oral glucose tolerance test • 7.0 mmol/L or more fasting (>11.1 non-fasting): diabetes likely, repeat fasting blood sugar to confirm on a separate day The test should be performed on venous blood and tested in a laboratory to confirm a diagnosis.	NHMRC, 2005
Oral glucose tolerance test	Before and 2 hours after a 75 gram oral glucose load is taken orally, the plasma glucose is measured. If this is greater than 11.1 mmol/L, diabetes is likely. If the 2 hour plasma glucose is between 7.8 and 11.0 mmol/L, there is impaired glucose tolerance. If it is less than 7.8 mmol/L, diabetes is unlikely.	NHMRC, 2005
Diabetes risk (Australian Type 2 Diabetes Risk Assessment Tool [AUSDRISK])	Diabetes risk may be calculated using AUSDRISK. This calculates a score related to the risk of developing diabetes over a 5-year period (see Appendix 4 in the original guideline document).	International Diabetes Institute, 2008
Glycated haemoglobin (HbA1c)	HbA1c may be used to as a diagnostic test for diabetes. HbA1c of 6.5% is the diagnostic cut-off. However, this is not currently approved by the Medicare Benefits Schedule (MBS) as a	Lee & Safranek, 2006;

Test	test to diagnose diabetes in Australia.	Bennett, Guo, & Dharmage, 2007

Type 2 Diabetes: Preventive Interventions

Target Group	Intervention	References
Pre-diabetes (impaired glucose tolerance, impaired fasting glycaemia, gestational diabetes) and those with an elevated Australian Type 2 Diabetes Risk Assessment Tool (AUSDRISK) score or with other specific risk factors with negative screening test.	• Increasing physical activity (e.g., 30 minutes brisk walking five times a week) and/or weight loss reduces risk of developing diabetes by 40%–60% in those at high risk. • Give advice on healthy low fat diet (<30% kcal or kilojoules from fat and <10% from saturated fat; high fibre, low glycaemic index with cereals, legumes, vegetables and fruits), weight loss and increased physical activity (see The Royal Australian College of General Practitioners smoking, nutrition, alcohol, physical activity [RACGP SNAP]: A population health guide to behavioural risk factors in general practice) • Refer patients to a dietitian and a physical activity program. • Provide pre-conception advice to women with a history of gestational diabetes.	Williamson, Vinicor, & Bowman, 2004; Knowler et al., 2002; Pan et al., 1997; Tuomilehto et al., 2001

Stroke

General practitioners (GP) should be alert to symptoms of transient ischaemic attacks (TIAs) in those aged 45 years and older and assess early in order to prioritise those needing urgent investigation and management. Adults with atrial fibrillation (AF) should have their absolute cardiovascular risk assessed. Patients with AF are at additional risk of thromboembolic disease and stroke (Wolf, Abbot, & Kannel, 1991).

Stroke: Identifying Risk

Who Is at Risk?	What Should Be Done?	How Often?	References
High Absolute Risk • Either calculated >15% absolute risk, clinical determined high risk or pre-existing cardiovascular disease (CVD) • Previous stroke (especially with coexistent atrial fibrillation [AF] or high grade [70%–99%] symptomatic carotid stenosis) • Previous transient	Question about symptoms of TIA. If TIA, stratify risk of stroke and consider anticoagulation.* (I,A) If AF, determine cause of AF and treat according to cardiovascular and thromboembolic risk. (II,B) Manage behavioural and physiological risk factors actively. Treat with antihypertensive and lipid-lowering medications unless contraindicated or clinically inappropriate. (II,B)	Every 12 months (IV,C)	National Vascular Disease Prevention Alliance, 2012; NSF, 2010 For stroke/TIA: Goldstein et al., 2006; Hankey, 2001; "Management of patients with stroke," 2008

Who Is at Risk? ischaemic attack (TIA)	What Should Be Done?	How Often?	References
Auscultation for Carotid Bruit	Auscultating for carotid bruits in asymptomatic people is not recommended in the general adult population as a screening tool for stroke risk. Screening with duplex ultrasonography in this population is not cost-effective (yields many false positive results) coupled with the fact that the overall benefit of surgery is at best small, hence very careful selection of patients is needed to justify surgery in those with severe (>60%) but asymptomatic stenosis.†		Floriani et al., 1988; Sauve et al., 1994; Goldstein et al., 2006
	However, the presence of a carotid bruit has been shown to be associated with increased risk of myocardial infarction and cardiovascular death, so may be a useful prognostic marker when assessing cardiovascular risk generally.		Pickett et al., 2008
	Screen patients with known asymptomatic carotid artery stenosis for other treatable causes of stroke and treat these intensively.		

*Anticoagulation with warfarin should be considered in patients with documented ischaemic stroke or TIAs due to AF.

†Antiplatelet therapy should be considered for non-cardioembolic stroke or TIA.

Tests to Detect Stroke Risk

Test	Technique	Reference
Question about transient ischaemic attack (TIA) ABCD2 tool	Question patient or carer regarding symptoms of sudden onset of loss of focal neurological function such as weakness or numbness of arms or legs, speech disturbance, double vision or vertigo. All patients with suspected TIA should have stroke risk assessment including the ABCD2 tool: • Age: >60 years (1 point) • BP: >140/90 mmHg (1 point) • Clinical features: unilateral weakness (2 points), speech impairment without weakness (1 point) • Duration: >60 min (2 points), 10–59 min (1 point) • Diabetes (1 point) Important additional information also required: • Presence of atrial fibrillation (AF), signs that might indicate carotid disease (e.g., anterior circulation signs) who are candidates for carotid surgery or 2 or more TIAs within previous 7 days (crescendo TIA) For those deemed high risk (ABCD2 tool 4–7 and/or AF, potential carotid disease or crescendo TIA): urgent brain and carotid imaging ('urgent' is considered immediately, but certainly within 24 hours). If carotid territory symptoms, consider duplex ultrasound for patients who are potential candidates for carotid revascularisation. For those deemed high risk (ABCD2 tool 0–3 without AF, potential carotid disease or crescendo TIA): computed tomography (CT) brain (and carotid ultrasound where indicated) as soon as possible (i.e., within 48–72 hours).	NSF, 2010

For further information about secondary prevention after stroke or TIA, see www.strokefoundation.com.au .

See also the NGC summary of the RACGP guideline Screening tests of unproven benefit.

Kidney Disease

Patients should be screened for kidney disease if they are at high risk (B).

Kidney Disease: Identifying Risk

Who Is at Risk?	What Should Be Done?	How Often?	References
High Risk • Smoking ≥40 years • Hypertension • Obesity • Family history of kidney disease • Diabetes • Aboriginal or Torres Strait Islander aged >30 years	Blood pressure (BP), albumin-creatinine ratio (ACR) and estimated glomerular filtration rate (eGFR) (III,A) If ACR positive, arrange 2 further samples for urine ACR over 2 months. (III,B)	Every 1–2 years* (IV,C)	Hoy et al., 1998; Wang et al., 2008; Chadban et al., 2003; Johnson, 2004; Fox et al., 2004; Di Angelantonio et al., 2010; Hallan et al., 2006; Astor et al., 2008; Crowe, Halpin, & Stevens, 2008; Iseki et al., 2003; Eknoyan et al., 2003; Bleyer et al., 2000; Methven et al., 2011; Levey et al., 2003; NHMRC, 2005; Scottish Intercollegiate Guidelines Network (SIGN), 2008; Kidney Health Australia (KHA), 2007; KHA, 2006

*1 year for patients with hypertension or diabetes.

Tests to Detect Kidney Disease

<table>
<tr><th>Test</th><th colspan="3">Technique</th><th>References</th></tr>
<tr><td rowspan="4">Albuminuria</td><td colspan="3">Spot, untimed collection of urine for calculation urine albumin-to-creatinine ratio (UACR), preferably on a first morning void.

Note: dipstick urine test is not adequate to identify microalbuminuria.

Albumin:creatinine ratio (ACR)</td><td rowspan="4">Eknoyan et al., 2003; Methven et al., 2011</td></tr>
<tr><td></td><td>Females</td><td>Males</td></tr>
<tr><td>Normal</td><td><3.5 mg/mmol</td><td><2.5 mg/mmol</td></tr>
<tr><td>Microalbuminuria
Macroalbuminuria</td><td>3.5–35 mg/mmol
>35 mg/mmol</td><td>2.5–25 mg/mmol
>25 mg/mmol</td></tr>
<tr><td>Glomerular filtration rate (GFR)</td><td colspan="3">This is currently automatically reported with every test for serum creatinine using the abbreviated modification of diet in renal disease formula (staging is based on both GFR level and UACR (normoalbuminuria, microalbuminuria or macroalbuminuria):

• Stage 1 >90 mL/min/1.73 m^2 with microalbuminuria, proteinuria or haematuria
• Stage 2 (mild) 60–89 mL/min/1.73 m^2 with microalbuminuria, proteinuria or haematuria
• Stage 3a (mod) 45–59 mL/min/1.73 m^2
• Stage 3b (mod) 30–44 mL/min/1.73 m^2
• Stage 4 (severe) 15–29 mL/min/1.73 m^2
• Stage 5 (end-stage) <15 mL/min/1.73 m^2

Refer patients with stage 4 or 5 to renal unit or nephrologist, and consider referral at stage 3 or earlier if:

• Persistent significant albuminuria (ACR ≥30 mg/mmol, approximately equivalent to</td><td>Levey et al., 2003; KHA, 2007; Levey et al., 2009</td></tr>
</table>

Test	Technique	References
	protein:creatinine ratio ≥50 mg/mmol, or urinary protein excretion ≥500 mg/24 hours) • Rapidly declining estimated glomerular filtration rate (eGFR) (average [of at least three readings] decline >5 mL/min/1.73 m^2 in 6 months) • Chronic kidney disease (CKD) and hypertension that is hard to get to target despite at least 3 anti-hypertensive agents • Unexplained anaemia (<100 g/L) with eGFR <60mL/min/1.73m^2 The eGFR may be unreliable in the following situations: • Acute changes in renal function • Dialysis patients • Certain diets (e.g., vegetarian, high protein, recent ingestion of cooked meat) • Extremes of body size • Muscle diseases (may overestimate) or high muscle mass (may underestimate) • Children <18 years • Severe liver disease It has not been validated in all ethnic groups.	

Definitions:

Levels of Evidence

Level	Explanation
I	Evidence obtained from a systematic review of level II studies
II	Evidence obtained from a randomised controlled trial (RCT)
III–1	Evidence obtained from a pseudo-randomised controlled trial (i.e., alternate allocation or some other method)
III–2	Evidence obtained from a comparative study with concurrent controls: • Non-randomised, experimental trial • Cohort study • Case–control study • Interrupted time series with a control group
III–3	Evidence obtained from a comparative study without concurrent controls: • Historical control study • Two or more single arm study • Interrupted time series without a parallel control group
IV	Case series with either post-test or pre-test/post-test outcomes
Practice Point	Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees

Grades of Recommendations

Grade	Explanation
A	Body of evidence can be trusted to guide practice
B	Body of evidence can be trusted to guide practice in most situations
C	Body of evidence provides some support for recommendation(s) but care should be taken in its application

D Grade	Body of evidence is weak and recommendation must be applied with caution Explanation

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

- Cardiovascular disease (CVD)
- Hypertension
- Hyperlipidaemia
- Type 2 diabetes
- Stroke
- Kidney disease

Guideline Category

Counseling

Management

Prevention

Risk Assessment

Screening

Treatment

Clinical Specialty

Cardiology

Endocrinology

Family Practice

Geriatrics

Internal Medicine

Nephrology

Preventive Medicine

Intended Users

Advanced Practice Nurses

Nurses

Physician Assistants

Physicians

Public Health Departments

Guideline Objective(s)

- To facilitate evidence-based preventive activities for prevention of vascular and metabolic disease in primary care
- To provide a comprehensive and concise set of recommendations for patients in general practice with additional information about tailoring risk and need
- To provide the evidence base for which primary healthcare resources can be used efficiently and effectively while providing a rational basis to ensure the best use of time and resources in general practice

Target Population

Adult Australian population

Note: See the "Major Recommendations" field for age ranges associated with specific conditions.

Interventions and Practices Considered

1. Calculation and assessment of absolute cardiovascular disease (CVD) risk
2. Measurement of blood pressure
3. Providing lifestyle advice and education about hypertension and antihypertensive pharmacotherapy if necessary
4. Measurement of fasting blood lipids
5. Dietary and other lifestyle advice about hyperlipidaemia and lipid-lowering therapy if necessary
6. Screening for type 2 diabetes
    - Use of Australian Type 2 Diabetes Risk Assessment Tool (AUSDRISK) scoring to determine risk
    - Fasting blood sugar
    - Oral glucose tolerance test
    - Glycated haemoglobin (HbA1c)
7. Increased physical activity and/or weight loss, dietary advice for patients with pre-diabetes
8. Preconception advice to women with a history of gestational diabetes
9. Being alert to symptoms of transient ischaemic attacks (TIAs)
10. Auscultation for carotid bruit (not recommended for general population as screening tool for stroke)
11. Duplex ultrasonography as a screening tool for stroke
12. Risk assessment for stroke using age, blood pressure, clinical features, duration, diabetes (ABCD2) tool
13. Screening high risk patients for kidney disease
    - Albuminuria with calculation of albumin:creatinine ratio (ACR)
    - Glomerular filtration rate (GFR)

Major Outcomes Considered

Risk for and incidence of cardiovascular and metabolic diseases

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Sources of Recommendations

The recommendations in these guidelines are based on current, evidence-based guidelines for preventive activities. The Taskforce focused on those most relevant to Australian general practice. Usually this means that the recommendations are based on Australian guidelines such as those endorsed by the National Health and Medical Research Council (NHMRC).

In cases where these are not available or recent, other Australian sources have been used, such as guidelines from the Heart Foundation, Canadian or United States preventive guidelines, or the results of systematic reviews. References to support these recommendations are listed. However, particular references may relate to only part of the recommendation (e.g., only relating to one of the high-risk groups listed) and other references in the section may have been considered in formulating the overall recommendation.

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Levels of Evidence

Level	Explanation
I	Evidence obtained from a systematic review of level II studies
II	Evidence obtained from a randomised controlled trial (RCT)
III–1	Evidence obtained from a pseudo-randomised controlled trial (i.e., alternate allocation or some other method)
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III–3	Evidence obtained from a comparative study without concurrent controls: • Historical control study • Two or more single arm study • Interrupted time series without a parallel control group
IV	Case series with either post-test or pre-test/post-test outcomes
Practice Point	Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review

Description of the Methods Used to Analyze the Evidence

Not stated

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

These *Guidelines for preventive activities in general practice*, 8th edition, have been developed by a taskforce of general practitioners (GPs) and experts to ensure that the content is the most valuable and useful for GPs and their teams. The guidelines provide an easy, practical and succinct resource. The content broadly conforms to the highest evidence-based standards according to the principles underlying the Appraisal of Guidelines Research and Evaluation.

The dimensions addressed are:

- Scope and purpose
- Clarity of presentation
- Rigour of development
- Stakeholder involvement
- Applicability
- Editorial independence

The Red Book maintains developmental rigour, editorial independence, relevance and applicability to general practice.

Screening Principles

The World Health Organization (WHO) has produced guidelines for the effectiveness of screening programs. The Taskforce has kept these and the United Kingdom National Health Services' guidelines in mind in the development of recommendations about screening and preventive care.

Rating Scheme for the Strength of the Recommendations

Grades of Recommendations

Grade	Explanation
A	Body of evidence can be trusted to guide practice
B	Body of evidence can be trusted to guide practice in most situations
C	Body of evidence provides some support for recommendation(s) but care should be taken in its application
D	Body of evidence is weak and recommendation must be applied with caution

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Not stated

Description of Method of Guideline Validation

Not applicable

Evidence Supporting the Recommendations

References Supporting the Recommendations

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Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for selected recommendations (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Prevention of cardiovascular and metabolic disease by changing behavioural and physiological risk factors

Potential Harms

Not stated

Qualifying Statements

Qualifying Statements

- The information set out in this publication is current at the date of first publication and is intended for use as a guide of a general nature only and may or may not be relevant to particular patients or circumstances. Nor is this publication exhaustive of the subject matter. Persons implementing any recommendations contained in this publication must exercise their own independent skill or judgement or seek appropriate professional advice relevant to their own particular circumstances when so doing. Compliance with any recommendations cannot of itself guarantee discharge of the duty of care owed to patients and others coming into contact with the health professional and the premises from which the health professional operates.
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- These guidelines have not included detailed information on the management of risk factors or early disease (e.g., what medications to use in treating hypertension). Similarly, they have not made recommendations about tertiary prevention (preventing complications in those with established disease). Also, information about prevention of infectious diseases has been limited largely to immunisation and some sexually transmitted infections (STIs).

Implementation of the Guideline

Description of Implementation Strategy

For preventive care to be most effective, it needs to be planned, implemented and evaluated. Planning and engaging in preventive health is increasingly expected by patients. The Royal Australian College of General Practitioners (RACGP) thus provides the Red Book and *National guide to inform evidence-based guidelines*, and the Green Book (see the "Availability of Companion Documents" field) to assist in development of programs of implementation. The RACGP is planning to introduce a small set of voluntary clinical indicators to enable practices to monitor their preventive activities.

Implementation Tools

Chart Documentation/Checklists/Forms

Quick Reference Guides/Physician Guides

Resources

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Living with Illness

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

Prevention of vascular and metabolic disease. In: Guidelines for preventive activities in general practice, 8th edition. East Melbourne (Australia): Royal Australian College of General Practitioners; 2012. p. 50-9.

Adaptation

This guideline has been partially adapted from Australian, Canadian, United Kingdom, and/or United States preventive guidelines.

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Guideline Developer(s)

Royal Australian College of General Practitioners - Professional Association

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Financial Disclosures/Conflicts of Interest

Not stated

Guideline Status

This is the current release of the guideline.

Guideline Availability

Electronic copies: Available in Portable Document Format (PDF) from the Royal Australian College of General Practitioners (RACGP) Web site .

Availability of Companion Documents

The following are available:

- Preventive activities over the lifecycle – adults. Preventive activities over the lifecycle – children. Electronic copies: Available in Portable Document Format (PDF) from the Royal Australian College of General Practitioners (RACGP) Web site .
- Putting prevention into practice (green book). East Melbourne (Australia): Royal Australian College of General Practitioners; 2006. 104 p. Electronic copies: Available in PDF from the RACGP Web site .
- National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people. East Melbourne (Australia): Royal Australian College of General Practitioners; 2012. 100 p. Electronic copies: Available in PDF from the RACGP Web site .
- Supporting smoking cessation: a guide for health professionals. East Melbourne (Australia): Royal Australian College of General Practitioners; 2011. 80 p. Electronic copies: Available in PDF from the RACGP Web site .

In addition, the appendices of the original guideline document provide the AUDIT-C assessment tool, the Australian Type 2 Diabetes Risk Assessment (AUSDRISK) assessment tool and the Australian cardiovascular risk charts.

Patient Resources

None available

NGC Status

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